

# Regional Land Cover Monitoring System

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 Affiliations: (1) University of San Francisco and Spatial Informatics Group; (2) US Forest Service Remote Sensing Applications Center (USFS RSAC); (3) Asian Disaster Preparedness Center (ADPC)

## Why this project?

Monitoring land cover and land use change is important for land-related policy development, land resource planning, and understanding ecosystem services including resilience to climate change, biodiversity conservation. In the Mekong region, however, monitoring updates are infrequent and classification systems do not always serve key user groups. At the regional level, only global land cover maps are currently available and these lack the typological resolution necessary for many regional applications.

## Approach/Project Activities

### The Regional Land Cover Monitoring System (RLCMS)

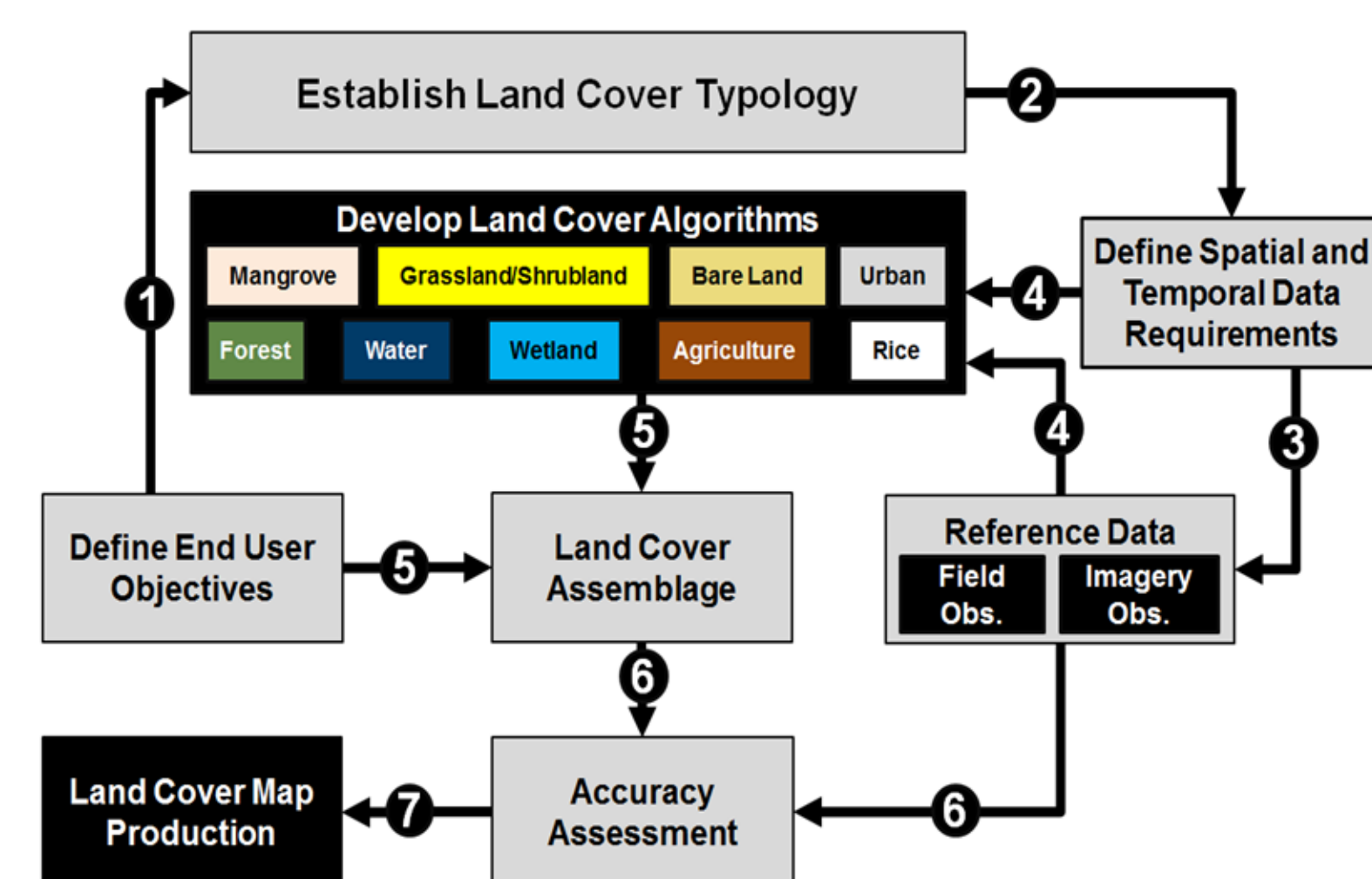
- Is developed collaboratively
- Produces regionally consistent products at regular intervals
- Serves the expressed needs of multiple users in the region
- Uses a transparent, well documented, open source approach
- Includes quality control / quality assurance methodology

### Project activities

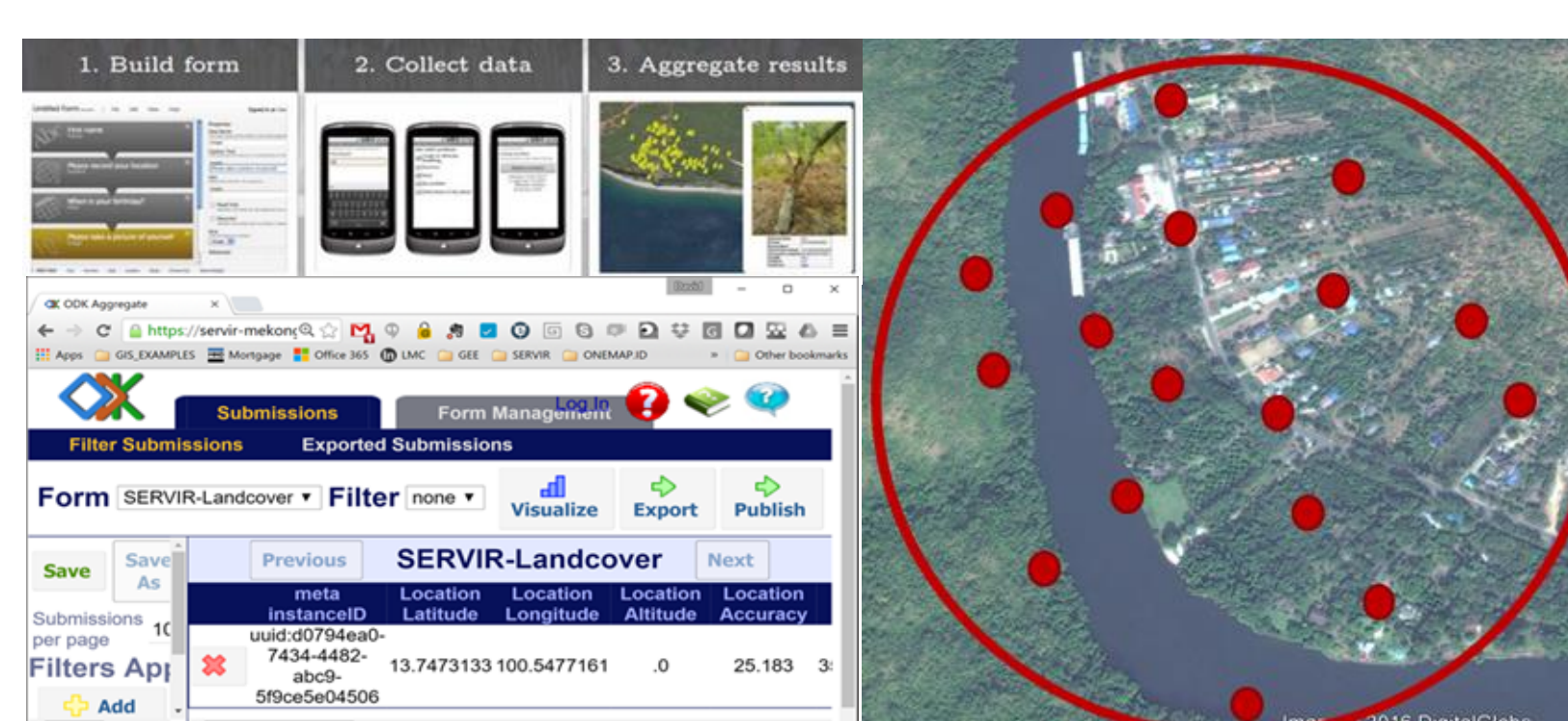
- Assessment of end user needs and definition of objectives
- Identification of regional land cover typology and definition of biophysical parameters
- Development of a remote sensing cloud-based RCLMS, using Google Earth Engine (GEE).

### RCLMS components:

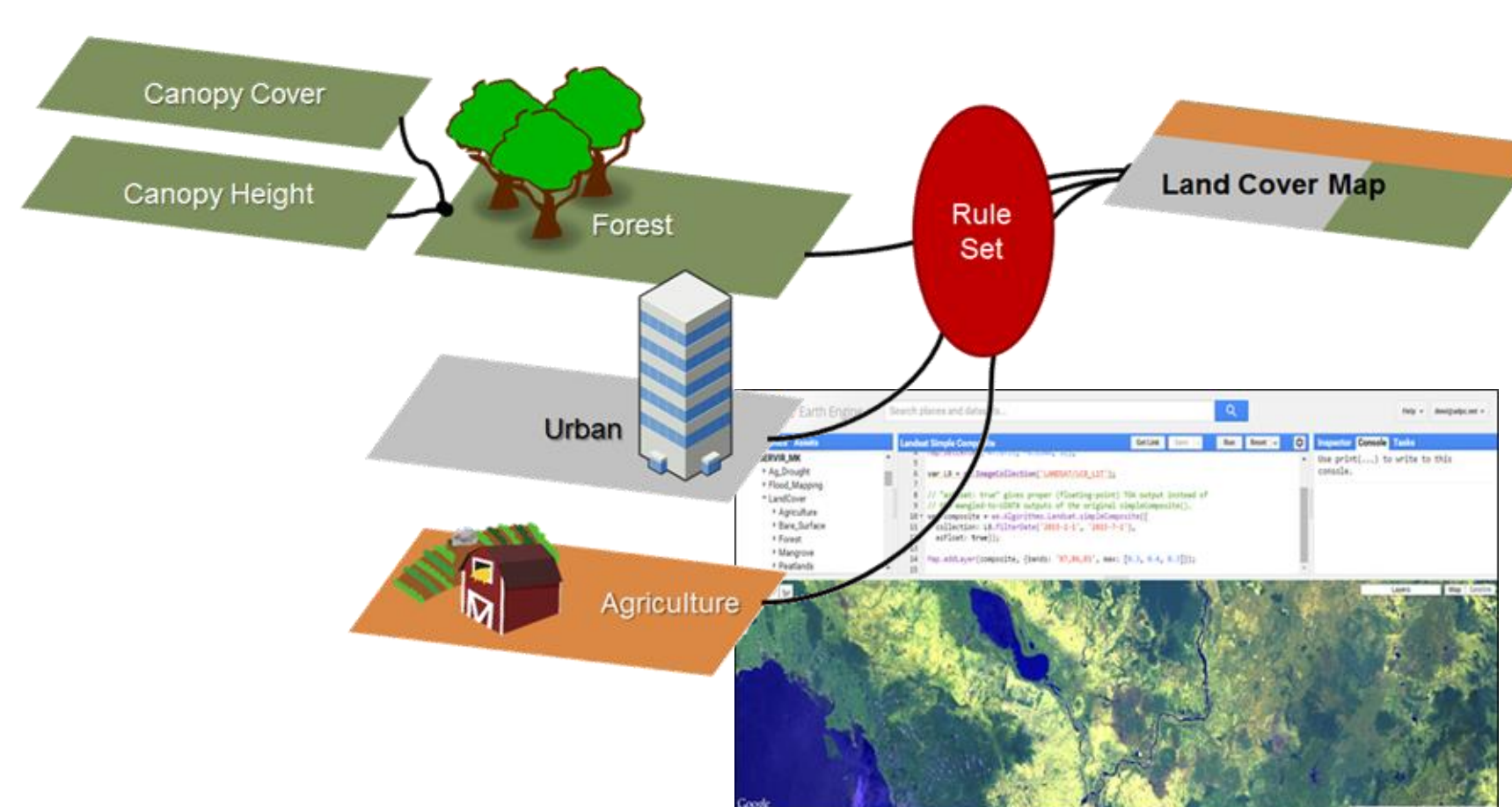
- Google Earth Engine (GEE) performs image analysis based on land cover type algorithm.
- A user-friendly site/app on Google's appspot.com exposes the application to users
- An open-source high resolution image viewing and reference data collection system (MAPCHA).



Production and operational framework of the Regional Land Cover Monitoring System framework



Reference data collection system using high resolution satellite images



Leveraging Google Earth Engine to derive land cover primitive classes for assembly into final classes

## Objectives

- To develop a unified regional (satellite-based) land cover monitoring system to serve user defined objectives
- To produce annual land cover maps of the Lower Mekong Countries: Cambodia, Lao PDR, Myanmar, Thailand, and Vietnam for 2000 to 2015,
- To provide an analysis tool that can easily be used for different time-series.

## Earth Observations data and other inputs

- Optical satellite data (LandSat, Aster, Modis...)
- Radar data (Sentinel, SRTM...)
- High-Resolution Satellite Imagery
- Context Data
- Reference data information from the Mapcha and likely other reference data collection tools.

## Outcomes/Anticipated Impacts

- A robust cloud-based remote sensing platform using common input data sources to regularly generate unified high-quality land cover maps reflecting the needs of countries and agencies.
- Improved policy, planning and decision making among a broad range of sub-national, national and regional users.
- A system leveraging collaboration and partnership in land cover monitoring in the Lower Mekong Region.
- Collaboration between regional government agencies, SERVIR-Mekong and the Greater Mekong Sub-region Core Environment Program (CEP) as an example of synergies among partners to support sustainable development in Mekong region.

## Project Partners

Lower Mekong Region government agencies and universities (most of the 'End Users' listed below), US Forest Service Remote Sensing Applications Center (USFS RSAC), SilvaCarbon Program, Asian Development Bank - Core Environmental Program (ADB-CEP), Google Earth Engine Team, NASA Applied Science Program, University of Maryland Department of Geographical Sciences.

## End Users

- Forestry Department, Ministry of Environment, Forestry, and Mines, Myanmar
- Forest Inventory and Planning Institute, Ministry of Agriculture and Rural Development (MARD) Vietnam
- Directorate of Water Resources, MARD, Vietnam
- Ministry of Environment, Cambodia
- Department of Forestry, Laos
- Land Development Department, Thailand
- One Map Myanmar Project
- Greater Mekong Subregion - Core Environment Program (CEP) (Acting Secretariat: Asian Development Bank)
- Greater Mekong Subregion Core Environment Program
- UNDP- Cambodia
- Mekong River Commission (MRC)
- International Rice Research Institute (IRRI)



A collaborative effort – participants of the second Regional Land Cover Monitoring System production workshop

## Initial Results

